

Applicant : Laurence E. Allen III  
Serial No. : 10/775,613  
Filed : February 9, 2004  
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Attorney's Docket No.: 10887-009002

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for separating a mixture, the method comprising:  
~~providing a slurry including a separation liquid and one or more particulate media materials;~~  
performing one or more classification separations on a slurry including a separation liquid and one or more particulate media materials, the slurry to produce a classified media having a controlled particle size distribution of the particulate media materials wherein performing the one or more classification separations separates from the slurry a coarse fraction containing coarse particles of the one or more media materials, the coarse particles having a particle size greater than a first particle size threshold;  
performing one or more classification separations to separate from the slurry a fine fraction containing fine particles of the one or more media materials, the fine particles having a particle size less than a second particle size threshold, wherein the one or more classification separations separating from the slurry a coarse fraction and the one or more classification separations to separate from the slurry the fine fraction produce a classified media having a controlled particle size distribution of the particulate media materials;  
combining the classified media with a mixture to be separated to generate a separation mixture, wherein the mixture to be separated includes plastic; and  
performing one or more density separations on the separation mixture.
2. (Original) The method of claim 1, further comprising:  
regenerating the classified media by performing a classification separation of the media after performing at least one density separation on the separation mixture.

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3. (Currently Amended) A method for separating a mixture, the method comprising:  
The method of claim 2, wherein:

performing one or more classification separations on a slurry including a  
separation liquid and one or more particulate media materials to produce a classified media  
having a controlled particle size distribution of the particulate media materials;

combining the classified media with a mixture to be separated to generate a  
separation mixture, wherein the mixture to be separated includes plastic;

performing one or more density separations on the separation mixture; and  
regenerating the classified media by performing a classification separation of the  
media after performing at least one density separation on the separation mixture, including

regenerating the classified media includes removing particulate material from the  
classified media having a particle size smaller than a fine size particle threshold.

4. (Canceled)

5. (Currently Amended) The method of claim [[4]]1, further comprising:  
before performing a first density separation on the separation mixture, adding a  
very coarse fraction of the one or more media materials to the mixture, the very coarse fraction  
containing media particles that substantially report to separator underflow.

6. (Currently Amended) The method of claim [[4]]1, wherein:  
the first particle size threshold and the second particle threshold are determined by  
parameters of a separation system.

7. (Original) The method of claim 1, wherein:

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performing one or more classification or density separations on the slurry or the separation mixture, respectively includes separating the slurry or the separation mixture using one or more hydrocyclone separators.

8. (Currently Amended) The method of claim 1, wherein:

performing one or more classification or density separations on the slurry ~~media~~ or the separation mixture, respectively, includes separating the slurry or the separation mixture using one or more cylindrical vortex separators.

9. (Original) The method of claim 1, wherein:

performing one or more classification or density separations on the slurry or the separation mixture, respectively, includes separating the slurry or the separation mixture using one or more hydrocyclone separators and one or more cylindrical vortex separators.

10. (Original) The method of claim 1, wherein:

performing one or more classification separations on the slurry includes separating the slurry using an arrangement of one or more density separators; and  
performing one or more density separations on the separation mixture includes separating the separation mixture using the arrangement of one or more density separators.

11. (Original) The method of claim 1, wherein:

the one or more particulate media materials include one or more of magnetite, titanium dioxide, sand or ferrosilicate.

12. (Canceled)

13. (Currently Amended) The method of claim 1, wherein:

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the one or more particulate media materials include magnetite and the ~~separation~~  
classified media includes magnetite particles having a particle size distribution in the range from  
about 5 to about 30 microns.

14: (Currently Amended) The method of claim 1, wherein:

the one or more particulate media materials include magnetite and the ~~separation~~  
classified media includes magnetite particles having a particle size distribution in the range from  
about 5 to about 25 microns.

15. (Original) The method of claim 1, wherein performing one or more classification  
or density separations on the slurry or the separation mixture, respectively, comprises:

separating the slurry or the separation mixture in a first density separator to  
generate a first fraction and a second fraction;

separating the first fraction in a second density separator to generate a third  
fraction;

recovering liquid from the third fraction;

combining the recovered liquid and the second fraction; and

separating the second fraction in a third density separator.

16. (Original) The method of claim 15, wherein:

separating the first fraction in a second density separator includes generating the  
third fraction and a fourth fraction, the third fraction including a larger amount of liquid than the  
fourth fraction.

17. (Original) The method of claim 15, wherein:

the first density separator is a hydrocyclone and the second and third density  
separators are cylindrical vortex separators.

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18. (Original) The method of claim 15, wherein:  
the first density separator is a cylindrical vortex separator and the second and third density separators are hydrocyclone separators.

19-28. (Canceled)

29. (Currently Amended) ~~The method of claim 11,~~ A method for separating a mixture, the method comprising:  
performing one or more classification separations on a slurry to produce a classified media having a controlled particle size distribution of the particulate media materials, wherein the slurry includes a separation liquid and one or more particulate media materials, the one or more particulate media materials including one or more of magnetite, titanium dioxide, sand or ferrosilicate;  
combining the classified media with a mixture to be separated to generate a separation mixture, wherein the mixture to be separated includes plastic wherein the mixture to be separated includes and metal; and  
performing one or more density separations on the separation mixture.

30. (Currently Amended) A method for making a classified media, comprising:  
~~providing a slurry including a separation liquid and one or more particulate media materials, wherein the particulate media materials include particles having a size between 5 and 30 microns;~~  
performing a classification separation on a slurry the slurry in a density separator, wherein the slurry includes a separation liquid and one or more particulate media materials and the particulate media materials include particles having a size between 5 and 30 microns, the separation is performed to produce a classified media having a particle size distribution between a first particle size threshold and a second particle size threshold, where the first and second particle size thresholds are determined by characteristics of the density separator; and

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repeating the step of performing a classification separation until the classified media is substantially free of particles 5 microns and under.

31. (Previously Presented) The method of claim 30, further comprising combining the classified media with a mixture including plastics and separating the mixture in the density separator.

32. (Previously Presented) The method of claim 15, wherein the steps of separating the slurry or the separation mixture in a first density separator, separating the first fraction in a second density separator and separating the second fraction in a third density separator include operating a single pump that is coupled to the first, second and third density separators.

33. (Previously Presented) The method of claim 15, wherein recovering liquid from the third fraction includes sending the third fraction to a dewatering screener coupled to an exit port of the second density separator.

34. (New) A method for separating a mixture, the method comprising:  
performing one or more classification separations on particulate media materials, wherein performing the one or more classification separations separates from the particulate media materials a coarse fraction containing coarse particles of the one or more media materials, the coarse particles having a particle size greater than a first particle size threshold;  
performing one or more classification separations to separate from the particulate media materials a fine fraction containing fine particles of the one or more media materials, the fine particles having a particle size less than a second particle size threshold, wherein the one or more classification separations separating from the particulate media materials a coarse fraction and the one or more classification separations to separate from the particulate media materials the fine fraction produce a classified media having a controlled particle size distribution of the particulate media materials;

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combining a slurry of the classified media in a separation liquid with a mixture to be separated to generate a separation mixture, wherein the mixture to be separated includes plastic; and

performing one or more density separations on the separation mixture.

35. (New) The method of claim 34, wherein the first threshold is 30 microns and the second threshold is 5 microns.